



U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

MAY 29 2001

DOT-E 9221
(FIFTH REVISION)

EXPIRATION DATE: April 30, 2003

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Applied Companies
Valencia, CA
2. PURPOSE AND LIMITATIONS:
 - a. This exemption authorizes the manufacture, mark, sale and use of non-DOT specification stainless steel cylinders which are part of a military weapons system to be used for the transportation in commerce of nitrogen, argon or helium. This exemption provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.
 - b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.302(a) and 175.3 in that non-DOT specification cylinders are not authorized packagings, except as specified herein.
5. BASIS: This exemption is based on the application of Applied Companies dated April 30, 2001, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

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Proper Shipping Name/ Hazardous Material Description	Hazard Class/ Division	Identi- fication Number	Packing Group
Argon, compressed	2.2	UN1006	N/A
Helium, compressed	2.2	UN1046	N/A
Nitrogen, compressed	2.2	UN1066	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Prescribed packaging is a non-DOT specification girth welded stainless steel cylinder having 75 cubic inches maximum water capacity and 5300 psi maximum service pressure, manufactured in compliance with AEC drawing 270-14 Revision D dated February 1986, on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA) and DOT Specification 3HT (§ 178.35 and § 178.44) except as follows:

§ 178.35(e) *Safety devices.*

Applies except a statement verifying the adequacy of the pressure relief devices for each cylinder design must be submitted to the OHMEA prior to initial shipment.

§ 178.44(a) *Type, size and service pressure.*

Girth welded stainless steel type cylinder with one end fitting welded in accordance with AEC drawing 270-14 Revision D, with a water capacity not to exceed 75 cubic inches water volume and a service pressure of 5,300 psig.

§ 178.44(b) *Authorized steel.*

(1) Type ARMCO Nitronic 40 (21-6-9) stainless steel with the following analysis is authorized for the cylinder body with proper welding procedure.

CHEMICAL ANALYSISPERCENT MAY 29 2001

Carbon	0.040 max.
Manganese	8.00/10.00
Phosphorous	0.060 max.
Sulfur	0.030 max.
Silicon	1.00 max.
Chromium	19.00/21.50
Nickel	5.50/7.50
Nitrogen	0.15/0.40

(2) Nitronic 50 material in compliance with ASTM A 479 type XM-19 is authorized for the welded fitting.

§ 178.44(d) *Manufacture.*

(Add) Each cylinder shall be subjected to a process treatment after welding and before stress relieving by hydrostatically pressurizing to at least 100 percent but not more than 110 percent of the test pressure, and maintained at this pressure for 3 minutes. The process treatment must be witnessed by an independent inspector. Total and permanent expansion need not be recorded.

§ 178.44(e) *Welding or Brazing.*

(1) Welding, as prescribed in § 178.44(a) of this exemption, is authorized.

(2) All pressure welds must be 100 percent radiographed and penetrant inspected per § 178.44(n) of this exemption after hydrostatic test.

§ 178.44(f) *Wall thickness.*

(1) Minimum wall thickness for any cylinder must be 0.050 inch. The minimum wall thickness must be such that the wall stress at the minimum specified test pressure shall not exceed 75 percent of the minimum tensile strength of the stainless steel and such stress shall not be over 112,000 psi.

(2) and (3) * * *

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§ 178.44(g) *Heat treatment.*

The half cylinders may be stress relieved or annealed for forming. Welded cylinders must be stress relieved at a temperature of $900^{\circ}\text{F} \pm 25^{\circ}$ for one hour. Stress relieving to be done after process treatment and before hydrostatic test.

§ 178.44(j) *Cycling tests.*

(1) * * *

(2) Cycling test of each lot is not required. Instead each design must be qualified per § 178.44(p) of this exemption.

§ 178.44(m) *Physical tests.* Not required.

§ 178.44(n) *Magnetic particle inspection.*

Not required. Instead, each cylinder must be inspected using apparatus and procedures for liquid penetrant examination in accordance with ASTM E-165-65. Inspection shall be performed externally on the finished cylinder after hydrostatic test. Evidence of discontinuities, which in the opinion of the independent inspector may significantly weaken or decrease the durability of the cylinder, shall be cause for rejection.

§ 178.44(p) *Acceptable results of tests.*

(1) Flattening required without cracking to six times the wall thickness of the cylinder.

(2) Physical tests: Not required.

(3) Burst pressure shall be at least $4/3$ times the test pressure. Failure must initiate in the sidewall of the cylinder in a longitudinal direction. Actual burst pressure must be recorded.

(4) Cycling: Each design must be qualified by cycle testing 3 prototype cylinders from zero to marked service pressure for 50,000 cycles minimum without distortion or failure. All cycled cylinders must be destroyed.

§ 178.44(q) *Rejected cylinders.*

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Repair of welded seams by welding prior to process treatment authorized; subsequent thereto, cylinders must be heat-treated and pass all prescribed tests.

§ 178.44(r) *Marking.*

(1) Applies except instead of DOT-3HT, cylinders must be marked "DOT-E 9221" followed by the service pressure in accordance with § 178.35(f).

(2) Stamping of elastic expansion is not required.

(3) * * *

§ 178.44(s) *Inspectors report.*

The inspector's report under the provisions of § 178.35 must be appropriately modified to reflect compliance with this exemption.

b. TESTING - Each cylinder must be reinspected and hydrostatically retested every 3 years in accordance with § 173.34(e) as prescribed for DOT-3HT cylinders except that the rejection elastic expansion does not apply.

c. OPERATIONAL CONTROLS -

(1) A cylinder manufactured under the exemption is not authorized 30 years after the date of manufacture.

(2) Cylinders are limited to use in military weapons systems. With the exception of the maximum service life, cylinders must conform to the requirements prescribed in § 173.302(a)(2). A copy of the inspector's report on the first lot of cylinders produced must be submitted to the OHMEA prior to initial shipment.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

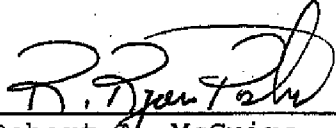
- b. A person who is not a holder of this exemption, but receives a package covered by this exemption, may reoffer it for transportation provided no modifications or changes are made to the package and it is offered for transportation in conformance with this exemption and the HMR.
- c. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.
- d. Each packaging manufactured under the authority of this exemption must be marked with a registration symbol designated by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.
- e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.
- f. Cylinders must be shipped in strong outside packagings in conformance with § 173.301(k).
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight and cargo only aircraft.
10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each aircraft or motor vehicle used to transport packages covered by this exemption. The shipper shall furnish a copy of this exemption to the air carrier before or at the time the shipment is tendered.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
 - o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must also inform the AAHMS, in writing, as soon as practicable of any incidents involving the package and shipments made under this exemption.

Issued in Washington, D.C.:

for 
Robert A. McGuire
Associate Administrator for
Hazardous Materials Safety

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(DATE)

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590.
Attention: DHM-31.

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

Copies of exemptions may be obtained from the AAHMS, U.S. Department of Transportation, 400 7th Street, S.W., Washington, DC 20590-0001, Attention: Records Center, 202-366-5046.

PO: KFW/alb